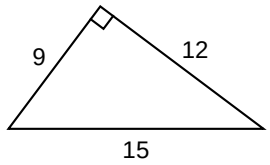
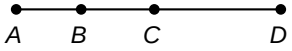
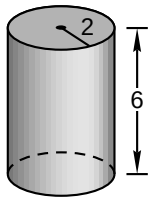
28. (8) Find the area of this right triangle. Dimensions are in centimeters.



29. (1) AB is $4\frac{2}{3}$ meters. BC is $5\frac{1}{4}$ meters. CD is $9\frac{1}{12}$ meters. Find AD.



30. (20) A right circular cylinder has a radius of 2 kilometers and a height of 6 kilometers, as shown. Find the volume of the right circular cylinder.



LESSON 27 *More on the Distributive Property • Simplifying Decimal Equations*

27.A more on the distributive property

Remember that we can simplify expressions such as

$$4(2 + 7)$$

by adding first or by using the distributive property and multiplying first.

Adding First	Multiplying First
$4(2 + 7)$	$4(2 + 7)$
$4(9)$	$8 + 28$
36	36

Thus far, we have restricted our use of this property to expanding simple expressions such as $4p(x + 3y)$.

$$4p(x + 3y) = 4px + 12py$$

In the following examples, we will use the distributive property to expand expressions that are more complicated. We remember that in each case the expression on the outside is multiplied by every term inside the parentheses.

example 27.1 Use the distributive property to expand $xy\left(y^2 - x^2z\right)$.

solution The xy is multiplied by y^2 and also by $-x^2z$.

$$xy\left(y^2 - x^2z\right) = (xy)\left(y^2\right) + (xy)\left(-x^2z\right)$$
$$= \boldsymbol{xy^3 - x^3yz}$$

example 27.2 Use the distributive property to expand $4xy^3(x^4y - 5x)$.

solution $4xy^3$ is to be multiplied by both x^4y and $-5x$.

$$4xy^3(x^4y - 5x) = (4xy^3)(x^4y) + (4xy^3)(-5x)$$
$$= \mathbf{4x^5y^4 - 20x^2y^3}$$

example 27.3 Use the distributive property to expand $(ay - 4y^5)2x^2y$.

solution It is not necessary to write down two steps. We can do the multiplication in our head if we are careful.

$$(ay - 4y^5)2x^2y = \mathbf{2ax^2y^2 - 8x^2y^6}$$

example 27.4 Use the distributive property to expand $8m^2x(5m^3x - 3x^5 + 2x)$.

solution This time $8m^2x$ must be multiplied by all three terms inside the parentheses.

$$8m^2x(5m^3x - 3x^5 + 2x) = (8m^2x)(5m^3x) + (8m^2x)(-3x^5) + (8m^2x)(2x)$$
$$= \mathbf{40m^5x^2 - 24m^2x^6 + 16m^2x^2}$$

27.B simplifying decimal equations

Finding the solutions of equations such as

$$0.4 + 0.02m = 4.6 \qquad \text{and} \qquad 0.002k + 0.02 = 4.02$$

can be facilitated if we begin by multiplying every term on both sides of the equation by the power of 10 that will make every decimal coefficient an integer. The value of the smallest decimal number in the problem often determines whether we multiply by 10 or 100 or 1000 or 10,000, etc.

example 27.5 Solve: $0.4 + 0.02m = 4.6$

solution The smallest decimal number in the problem is 0.02. We can convert 0.02 to 2 if we multiply by 100. Thus, we will multiply every term on both sides of the equation by 100 and then solve.

$0.4 + 0.02m = 4.6$	original equation
$40 + 2m = 460$	multiplied every term by 100
$2m = 420$	added -40 to both sides
$m = \mathbf{210}$	divided both sides by 2

example 27.6 Solve: $0.002k + 0.02 = 4.02$

solution This time, the smallest decimal number is 0.002, so we will use 1000 as our multiplier.

$0.002k + 0.02 = 4.02$	original equation
$2k + 20 = 4020$	multiplied every term by 1000
$2k = 4000$	added -20 to both sides
$k = \mathbf{2000}$	divided both sides by 2

practice Expand by using the distributive property:

a. $xy^2(y^2p - p)$ **b.** $(xy - x)2xy$

c. $3xp^3(p^5 - x^2p^8)$ **d.** $2x^2m^2(m^2 - 4m)$

Solve:

e. $0.08x - 0.1 = 16.7$ **f.** $0.7m + 0.6m = 3.4$

problem set 27

1. *(18)* Which of the following terms are like terms?

(a) $-7cba$ (b) $7cbd$ (c) $-2abc$ (d) $5bca$

2. *(2)* If two sides of a triangle have equal lengths, then what is true about the angles opposite those sides?

3. *(4)* Use two unit multipliers to convert 63,400 inches to miles.

4. *(10)* Use two unit multipliers to convert 5800 square inches to square feet.

5. *(3,8)* The perimeter of a square is 12 cm. Find the area of the square.

Solve:

6. *(23)* $x - \frac{1}{4} = \frac{5}{8}$ **7.** *(24)* $1\frac{1}{2}y = 6\frac{3}{4}$ **8.** *(24)* $\frac{x}{3\frac{1}{2}} = 4$

9. *(25)* $\frac{1}{2}x + \frac{3}{4} = -\frac{3}{8}$ **10.** *(27)* $0.02m + 0.2 = 1.4$ **11.** *(27)* $0.4x - 0.2 = -0.12$

12. *(26)* $5x - 3 - 2 = 3x - 2 + x$ **13.** *(26)* $x + 3 - 5 - 2x = x - 3 - 7x$

14. *(26)* $m + 4m - 2 - 2m = 2m + 2 - 3$

15. *(23)* (a) What value of x satisfies the equation $x + 3 = 2$?

(b) What value of x satisfies the equation $x + 5 = 4$?

(c) Are the solutions to both equations the same?

(d) Given your answer to part (c), are the two equations equivalent?

16. *(22)* Is –3 or 1 a root of the equation $x^2 + 2x = 3$?

Simplify:

17. *(21)* $p^2xyy^2x^2yx^2x$ **18.** *(21)* $3p^2x^4yp^5xxyy^2$

Simplify by adding like terms:

19. *(21)* $-4x + x^2 - 3x - 5 + 7x^2$ **20.** *(21)* $xyp^2 - 4p^2xy + 5xp^2y - 7yxp^2$

21. *(27)* Use the distributive property to expand $4x^2(ax - 2)$.

Evaluate:

22. *(19)* $(a - b) + (-a)^2$ if $a = -3$ and $b = 6$

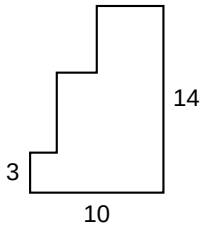
23. *(19)* $-(-p)^2 + (p - x)$ if $p = -2$ and $x = 5$

Simplify:

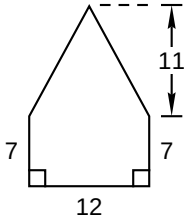
24. *(19)* $-3^2 - 3\left(3^2 - 4\right) - \sqrt[4]{16} - |-7 + 2|$

25. *(10)* $\frac{-6 - (-2 - 3) + 1}{4 - (-3) - 7}$

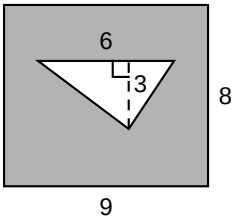
26. *(3)* Find the perimeter of this figure. All angles are right angles. Dimensions are in meters.



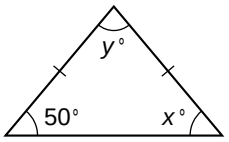
27. *(8)* Find the area of this figure. Dimensions are in kilometers.



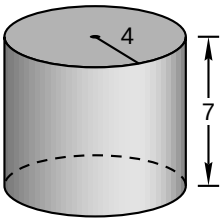
28. *(8)* Find the area of the shaded portion of this rectangle. Dimensions are in inches.



29. *(2)* Find x and y.



30. *(15)* A right circular cylinder has a radius of 4 feet and a height of 7 feet, as shown. Find the surface area of the right circular cylinder.



LESSON 28 Fractional Parts of Numbers • Functional Notation

28.A fractional parts of numbers

When we multiply a number by a fraction, we say that the result is a fractional part of the number. If we multiply $\frac{7}{8}$ by 48, we get 42. We say this mathematically by writing

$$\frac{7}{8} \times 48 = 42$$

and if we use words we say that

(seven eighths) (of 48) (is 42)

We can generalize this problem into an equation that has three parts.

$$(F) \times (\text{of}) = (\text{is})$$

The letter F stands for "fraction," and the words *of* and *is* associate the parts of the statement as we note in the following examples. We will use the variable *WN* to represent "what number" and *WF* to represent "what fraction." We will avoid the use of the meaningless variable x.